

## **REMARKS**

Claims 1-21 and 23-57 are presented for examination. Claims 1, 10, 18, 21, 29, 30, 33, 38, 40, 51 and 56 are currently amended. Claim 22 was previously canceled without prejudice or disclaimer of subject matter. Claims 9 and 11 are currently canceled without prejudice or disclaimer of subject matter. No new claims have been added. Accordingly, upon entry of this amendment, claims 1-8, 10, 12-21 and 23-57 will be pending.

Claims 1-6, 8, 9, 21, 23, 26-35, 37-42, 44-49, and 51-57 were rejected under 35 USC § 102(b) as being anticipated by Takubo (U.S. 6,329,610). Claims 10-12 and 14-18 were rejected under 35 USC § 102(b) as being anticipated by Burgess (U.S. 2001/0020548 A1).

Claims 7, 43 and 50 were rejected under 35 USC § 103(a) as being unpatentable over Takubo in view of Zohni (U.S. 2002/0117761 A1). Claims 13, 19 and 20 were rejected under 35 USC § 103(a) as being unpatentable over Burgess in view of Zohni. Claims 24 and 25 were rejected under 35 USC § 103(a) as being unpatentable over Takubo in view of Li (U.S. 5,928,005). Claim 36 was rejected under 35 USC § 103(a) as being unpatentable over Takubo.

### Takubo

Claims 1-6, 8, 9, 21, 23, 26-35, 37-42, 44-49 and 51-57 stand rejected under 35 USC 102(b) as being anticipated by Takubo. Claim 36 stands rejected under 35 USC 103(a) as being unpatentable over Takubo.

Claim 1 is currently amended, support for which can be found in the drawings and specification as filed, for example, at originally filed claim 9 and in the specification at paragraph [0044]. Claim 33 is currently amended, support for which can be found in the originally filed drawings and specification, for example, in Figure 3.

Applicants note that Takubo discloses a first via land of a wiring layer on a first surface of a first insulation layer that is a rigid layer and a second via land of a wiring layer on a second surface of a second insulation layer that is a flexible layer being electrically and mechanically connected with a **conductive pillar** *pierced through a third insulation layer* disposed between the first insulation layer and the second insulation layer. (Abstract)

The Examiner states that Takubo discloses, *inter alia*, a first blind via (107b), referring to Figure 17 of Takubo. (Office Action, Page 3) Applicants respectfully submit that 107b is not a blind via, but rather a **conductive pillar** piercing through a third insulation layer 103. (Abstract; col. 27, lines 64-67)

Takubo specifically recites that the wiring layers 11, 12 may be connected with a conductive pillar or, alternatively with a via hole. Takubo continues on to state that the wiring layer 11 and the wiring layer 14 should be connected with the conductive pillar. (Column 16, lines 49-60). In other words, Takubo specifically notes the difference between via holes and conductive pillars. Conductive pillars are used in Takubo to pierce through a **third insulation layer** to join two via lands of wiring layers on two other conductive layers (see column 16, lines 9-31 and the figures of Takubo). For example, in Figure 17, 107b is a conductive pillar, piercing through insulation layer 103 to join two via lands 106a, 104b. Via holes (not specifically labeled on Figure 17) are provided through two insulation layers 102, 101 (one on each side of insulation layer 103) to join via lands 106a, 104b to via lands 106b, 104a, respectively. Therefore, the invention of Takubo requires **three insulation** layers. One insulation layer is necessary for the conductive pillar piercing, and two insulation layers are placed on either side of the conductive pillar-containing insulation layer. In the paragraph bridging columns 16 and 17, Takubo notes that this “third insulation layer 23 and the conductive pillar 32 (referring here to Figure 1, of which Figure 17 to which the Examiner refers is a variation thereof) function as electric and mechanic interfaces that connect the rigid substrate and the flexible substrate. In other words, for a fine wiring layer with a finer L/S ratio, the

structure of the flexible substrate is used. For a portion to which the flexible substrate is mounted, the structure of the rigid substrate is used. These interfaces are accomplished by the third insulation layer 23 and the conductive pillar 32.” Therefore, the wiring board of Takubo requires **three insulation layers**, one of which has a conductive pillar pierced therethrough.

With respect to independent claims 1, 21, 29, 33, 38 and 40, each of the claims recite an interstitial bridge pad having a first side and a second side, wherein the first side physically contacts a first dielectric layer and the second side physically contacts a second dielectric layer. Furthermore, independent claims 1, 21, 29, 33, 38 and 40 each have been amended to require that, in the absence of an interstitial bridge pad therebetween, at least a portion of the first dielectric layer is fused to at least a portion of the second dielectric layer. The invention of claims 1, 21, 29, 33, 38 and 40, therefore, cannot have a third insulation layer present, as such as insulation layer would not allow at least a portion of the first dielectric layer to fuse to at least a portion of the second dielectric layer.

Furthermore, Applicants have amended independent claims 1, 21, 29, 30, 33, 38, 40, 51 and 56 to clarify that the “interstitial bridge pad is coaxial in a z direction with said first blind via and with said second blind via.” Takubo neither teaches nor fairly suggests such a structure. While not only being silent with the specific layout of the components, Takubo teaches away from this specific coaxial limitation by failing to show, in the drawings, a coaxial arrangement of the via holes and the corresponding via lands, which appears to be interpreted as corresponding to the interstitial bridge pads of the present invention by the Examiner (see Office Action, page 2, wherein via land 106a is referred to as a bridge pad).

With respect to claims 51 and 55 , these claims have been amended to clarify that the bridge layer consists of a plurality of interstitial bridge pads. Therefore, the bridge layer may not be an insulation layer having a bridge pad therein, but the bridge layer consists of bridge pads between a first dielectric layer and a second dielectric layer. As

discussed above, Takubo requires three insulation layers, the middle of which has a conductive pillar pierced therethrough. Claims 51, 55 and 56 require only two dielectric layers with a bridge pad therebetween, and, thus, are patentably distinct from Takubo.

Finally, independent claim 55 contains claim language, as previously presented, that supports the above discussion. More specifically, this claim requires a pair of opposed coaxial blind vias. As discussed above, Takubo fails to teach or fairly suggest a coaxial arrangement of the vias as presently claimed.

For at least these reasons, Applicants respectfully request reconsideration and withdrawal of the rejection of claims 1-6, 8, 9, 21-23, 26-35, 37-42, 44-49, and 51-57 as being anticipated by Takubo.

#### Burgess

Claim 10 is currently amended, support for which can be found in the specification as filed, for example, at originally filed claim 11. Claim 18 is currently amended, support for which can be found in the originally filed drawings, for example, at Figure 3. Applicants respectfully submit that no further search would be required for this amendment, as the subject matter added to claim 10 was previously searched as dependent claim 11 and the subject matter added to claim 18 only narrows the scope of claim 33 and, therefore, should not require a broadened search.

Burgess discloses methods for laser drilling blind vias at multiple depths in multilayer panels. The blind vias of Burgess are provided in a multilayer substrate to interconnect conductive layers at different locations along the substrate. (col. 12, lines 30-34, referring to Figure 26) The layers 2, 3, 4, and 5 are not bridge pads, but are rather electrically connecting layers, connecting one layer at one location of the substrate to another layer at another location of the substrate.

Burgess fails to teach or fairly suggest the inventive structure as currently claimed. Claim 10, as amended, requires that the “first annular ring, said first via, said interstitial bridge pad, said second via, and said second annular ring are coaxial with each other.” Burgess neither teaches nor fairly suggests this limitation. As a matter of fact, such a limitation would render Burgess unsatisfactory for its intended purpose. The “pads” 2, 53, 4 and 5 of Figure 26 of Burgess cannot be made coaxial with the vias because these pads must extend to electrically adjoin other vias.

Claim 18, as amended, requires that “said bridge pad is adapted to electrically interconnect said pair of opposed coaxial blind vias without electrically interconnecting any other blind vias.” As noted above, such a modification of Burgess would render Burgess unsatisfactory for its intended purpose. The “pads” 2, 53, 4 and 5 of Figure 26 of Burgess cannot connect a pair of opposed coaxial blind vias without electrically interconnecting any other blind via, as the intended purpose of Burgess is the daisy-chaining blind vias in multiple layers.

For at least these reasons, Applicants respectfully request reconsideration and withdrawal of the rejection of claims 10-12 and 14-18 as being anticipated by Burgess.

Zohni

Dependent claims 7, 43, and 50 stand rejected under 35 USC 103(a) as being unpatentable over Takubo in view of Zohni.

Zohni discloses an off-center solder ball attachment assembly. As discussed above, Takubo neither teaches nor fairly suggests the inventive structure as claimed in independent claims 1 and 40. Zohni is relied upon by the Examiner as a secondary reference for its alleged teaching of bridge pads and vias having certain diameters. While not acquiescing to the merits of the interpretation of Zohni by the Examiner, Applicants respectfully submit that Zohni, taken alone or combined with the teachings of Takubo, fails to overcome the deficiencies of the primary reference (Takubo) as discussed above.

and neither teaches nor fairly suggests the inventive structure as claimed in independent claims 1 and 40.

Furthermore, claims 7, 43, and 50, being dependent and further limiting claims 1 and 40 (which, as discussed above, should also be allowable over the prior art of record), should be allowable for that reason.

For at least the above reasons, Applicants respectfully request reconsideration and withdrawal of the rejection of claims 7, 43, and 50 as being unpatentable over Takubo in view of Zohni.

Dependent Claims 13, 19, and 20 stand rejected under 35 USC 103(a) as being unpatentable over Burgess in view of Zohni. As discussed above, Burgess neither teaches nor fairly suggests the inventive structure as claimed in dependent claims 10 and 18. Zohni fails to provide any teaching to overcome the deficiencies of Burgess discussed above.

Furthermore, claims 13, 19, and 20, being dependent and further limiting claims 10 and 18 (which, as discussed above, should also be allowable over the prior art of record), should be allowable for that reason.

For at least the above reasons, Applicants respectfully request reconsideration and withdrawal of the rejection of claims 13, 19, and 20 as being unpatentable over Burgess in view of Zohni.

Dependent claims 24 and 25 stand rejected under 35 USC 103(a) as being unpatentable over Takubo in view of Li. Li discloses a low insertion force connection using two interfitting components: a tapered element and a beam element which is deformed by the tapered element in the region where the primary forces are buckling, rather than bending. As discussed above, Burgess neither teaches nor fairly suggests the inventive structure as claimed in independent claim 21. Li fails to provide any teaching

to overcome the deficiencies of Burgess discussed above. More specifically, Li does not provide any teaching of coaxial blind vias being formed in a first dielectric layer and a second dielectric layer, nor does Li provide any teaching of interstitial bridge pads formed coaxial with the first blind via and the second blind via.

Furthermore, claims 24 and 25, being dependent and further limiting claim 21 (which, as discussed above, should also be allowable over the prior art of record), should be allowable for that reason.

For at least the above reasons, Applicants respectfully request reconsideration and withdrawal of the rejection of claims 24 and 25 as being unpatentable over Burgess in view of Li.

### **Conclusion**

In light of the arguments and amendments presented herein, the Applicants respectfully submit that all pending claims are in condition for allowance. Accordingly, reconsideration and allowance of this Application is earnestly solicited. Should any issues remain unresolved, the Examiner is encouraged to telephone the undersigned at the number provided below.

If there are any fees due in connection with the filing of this response, please charge such fees to our Deposit Account No. 17-0026. If a fee is required for an extension of time under 37 C.F.R. 1.136 not accounted for, such an extension is requested and the fee should also be charged to our Deposit Account.

Respectfully submitted,

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By: /Howard H. Seo/  
Howard Seo  
Reg. No. 43,106  
Attorney for Applicants

QUALCOMM Incorporated  
Attn: Patent Department  
5775 Morehouse Drive  
San Diego, California 92121  
Telephone: (858) 845-5235  
Facsimile: (858) 658-2502